Brief descriptions of NOAA-GLERL scientists planned activities/interests regarding the 2005 Lake Erie integrative field program.

Investigator	Description of Research
Steve Brandt	Spatially-explicit modeling of fish habitat quality: My research will focus on using spatially-explicit modeling to quantify the effects of oxygen availability, temperature, and food availability on the distribution, foraging, and potential growth response of walleye across Lake Erie.
Brian Eadie	Lake Erie sediment trapping: Sequencing traps were deployed in September 2004 at 5m above bottom near the deep hole in the central basin and at 5m above bottom and 30m below the surface near the deep hole in the eastern basin in an effort to calculate the rates of delivery of mass, nutrients and organic carbon to these sites. Sampling frequency was at 9-d intervals. These samples complement traps deployed (and retrieved monthly) at the same locations by Murray Charlton from April through October 2004, giving us one full year of samples. A review of published sediment accumulation rates and constituent concentrations will provide estimates of materials that are retained by the sediments for comparison.
Gary Fahnenstiel	HABS in western Lake Erie: Microcystis blooms in the western basin of Lake Erie will be the focus of an interdisciplinary program at GLERL. The first aspect will determine the factors controlling microcystin production by *Microcystis*, specifically the role of genetic and environmental factors. The second aspect will be to begin a event response capability that will eventually lead to development of bloom prediction capability
Nathan Hawley	Mooring deployment: I plan to deploy a set of moorings in Lake Erie to make time-series measurements of surface, waves, current velocity, water, temperature, and turbidity, and dissolved oxygen. These moorings will be deployed in conjunction with the moorings being deployed by scientists at the Canadian Centre for Inland waters. The objectives are to provide ground truth data for the proposed transects, provide ground-truthing for remote sensing, provide data for model calibration and verification, and to look at the dynamics of sediment resuspension and transport in the lake.
George Leshkevich	Satellite Remote Sensing of Chlorophyll and Harmful Algal Blooms: This project and in situ sampling on Lake Erie is being conducted in support of cooperative projects with Altarum and Bowling Green State University in an effort to further develop and tune algorithms for detection and monitoring of chlorophyll and harmful algal blooms (HABs) from satellite sensor data. In situ measurement of optical properties and water parameters (chlorophyll, TSM, DOC) will enable further development of algorithms for retrieval of these constituents from satellite sensor data as well as provide optical data for other research being conducted on Lake Erie.
Steve Lozano	Macroinvertebrate indices to assess habitat quality: There is a long history of using benthic macroinvertebrate indices to assess environmental quality. Howmiller and Scott (1977) developed a classification index of oligochaeta species that ranges from oligotrophic conditions to extreme organic pollution. I propose to refine their index and explore other multivariate statistical classification and ordination analyses. Samples will be collected along transects to evaluate the effect of oxygen and depth.
Stuart Ludsin	Habitat quality for fish: I am interested in quantifying variation in habitat quality for fish across Lake Erie, with particular emphasis on understanding how oxygen availability influences the vertical and horizontal distribution of fish and their prey, including their trophic interactions. Continuous collection of habitat information (temperature, light, oxygen, zooplankton) and fish distributions (with hydroacoustics) will eventually allow for spatially-explicit modeling of fish growth and habitat quality across the entire system. Likely focal species include rainbow smelt (planktivore), lake whitefish (benthivore), and burbot (piscivore).
Doran Mason	Food web structure and function: We will construct energy-flow food web models for the western, central and eastern basins of Lake Erie, for spring, summer and fall. The objective is to quantify food web structure and function in Lake Erie along a trophic gradient and across seasons. We will use ecological network analysis tools and network tools from the social sciences.

Mike McCormick	Diffusion/Lagrangian experiment in central Lake Erie: We will inject SF_6 into the hypolimnion of the central basin and attempt to trace the temporal evolution of the patch over several days. If we are fully successful we will be able to estimate both the horizontal turbulent diffusivities, as well as calculate the trajectory of the labeled patch.
Tom Nalepa	Macroinvertebrate production & food web effects: I plan to collect benthic samples at many of the same locations where fish are being collected. The idea is to link diet information with benthic food availability. Specifically for the benthos, I plan to determine biomass of the major groups and production of chironomids. Comparisons will be made between hypoxic vs. non-hypoxic areas in the central basin, and between the central basin and the eastern basin.
Steve Pothoven	Fish foraging: I am primarily interested in analyzing planktivore (rainbow smelt), lake whitefish, and other benthivorous fish diets across space, time, and relative to prey availability and the physical environment.
Steve Ruberg	Integrated Coastal Observing System: Real-time observation research in Lake Erie in 2005 will be focused on the integration of video imagery, a real-time temperature profiler, and an autonomous AUV experiment. In addition, the system will provide continuous measurements of oxygen, chlorophyll, turbidity, waves, currents, and temperature profiles in the western and central basins. These measurements will be used to trigger sampling events related to mayfly larvae and fish research. Real-time data access and system control functions will be provided to researchers via a web-based interface. The vessel-based AUV experiment will profile temperature, oxygen, and currents over several days, covering a broad spatial range, and providing insight into the dynamics of the central basin hypolimnion.
Dave Schwab	Coupled hydrodynamic-ecological modeling: This project is an outgrowth of a two-year (FY03-4) pilot program to study the relative effects of physical, chemical, and biological factors on the ecology of Lake Erie by examining the recent (25-50 yr) historical record. The project originally focused on developing a database for physical environmental parameters (wind, air and water temperature, etc.), and laying the groundwork for ecosystem forecasting in Lake Erie. This specific project will continue the development of a retrospective database of physical environmental variables for Lake Erie, as well as begin the process of coupled hydrodynamic-ecological modeling for Lake Erie.
Hank Vanderploeg	Exotic invertebrate effects on native food webs: We will examine spatial-temporal interactions among cercopagids, fish, and zooplankton in across Lake Erie with emphasis on interactions in the central basin to see how zooplankton or cercopagids utilize the hypoxic zone. We will use a variety of tools, including plankton survey system (PSS: optical plankton counter, CTD, fluorometer, oxygen probe mounted on a V-fin), nets, pumping, and water samples to map out horizontal and vertical distribution of plankton relative to forage fish distributions, as determined by colleagues with acoustics. Diel sampling of zooplankton and fishes at selected locations also will occur during summer to define prey selection of fishes as related to spatial distribution of zooplankton. We welcome participation of others to define vertical structure of the entire food web across basins and cooperate on experiments defining links between food web components. In the western basin we will be active examining mussel filtering and nutrient excretion and their connection to HABs.